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Invited Lectures

RATIONALES BEHIND THE TREATMENT OF CLASS V-LESIONS

Prof.dr.sc. Thomas Attin

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Thanks to the success of prevention efforts in dentistry prolonged retention of the teeth in the oral cavity is the case in a large part of the population. This has the consequence that the teeth of many people are exposed not only to a possible caries risk, but also to other influences, which may lead to structural dental hard tissue defects. These defect quite often occur at the cervical area of teeth, presenting as non-carious- and caries-related hard tissue loss.

Non-carious dental hard tissue loss might appear as dental erosions, which are caused by acidic impacts on the teeth, or as other hard tissue defects, such as abrasion or abfraction. Cervical dental hard tissue defects are often associated with very distinctive hard tissue loss resulting in a decreased satisfaction of patients with their appearance, the oral well-being, the chewing comfort and an increase of tooth hypersensitivities.

When treating severely worn teeth or teeth with cervical hard tissue loss of carious, the aetiology needs to be respected in order achieve a positive long-lasting outcome of the treatment.

Pozvana predavanja

OBRAZLOŽENJE ZA LIJEČENJE LEZIJA KLASJE V

Prof.dr.sc. Thomas Attin

Klinika za konzervativnu i preventivnu stomatologiju, Sveučilište u Zürichu

Zahvaljujući uspješnosti u preventivnim naporima u stomatologiji kod velikog je dijela stanovništva produljeno zadržavanje zuba u usnoj šupljini. To ima za posljedicu to što su zubi mnogih ljudi izloženi ne samo mogućem riziku od karijesa, već i drugim utjecajima koji mogu dovesti do strukturalnih oštećenja tvrdog zubnog tkiva. Ti se defekti često pojavljuju na cervikalnom području zuba, što predstavlja gubitak tvrdog tkiva uzrokovanog karijesom i nekarijesnim promjenama.

Nekariozni gubitak tvrdog tkiva zuba može se pojaviti kao erozije, koje su uzrokovane kiselim utjecajima na zube ili kao druga oštećenja tvrdog tkiva, poput abrazije ili abfrakcije. Oštećenja tvrdog tkiva na vratu zuba često su povezani s vrlo karakterističnim gubitkom tvrdog tkiva što rezultira smanjenim zadovoljstvom pacijenata njihovim izgledom, oralnim zdravljem, udobnošću žvakanja i povećanjem preosjetljivosti zuba.

Kod liječenja ozbiljno istrošenih zuba ili zuba s gubitkom tvrdog zubnog tkiva u cervikalnoj regiji uzrokovanom karijesom, potrebno je poštivati etiologiju kako bi se postigao pozitivan dugotrajni ishod liječenja.

THE THERAPY OF PERI-IMPLANTITIS - WHAT HAS CHANGED IN 20 YEARS?

PD Dr. med. dent. Philipp Sahrman

Clinic of Conservative and Preventive Dentistry, University of Zurich

Over the last 40 years, implant therapy has become a very successful and popular modality to replace missing teeth.

Despite excellent survival rates for dental implants clinical studies from the beginning consistently revealed one and the same major biological complication: peri-implantitis. Affected implants had to be classified as failures that would finally get lost, inflicting also vast damage to the adjacent bone structure.

Since the problem was novel and treatment schemes lacked from any evidence there was great uncertainty of how to overcome the peri-implant inflammations.

Then, more than twenty years ago, Lang and Mombelli developed the "Cumulative Interceptive Supportive Therapy" (CIST) protocol as a very simple tool to avoid and to treat peri-implantitis. Thereby, specific treatment steps are suggested depending on the clinical parameters of the individual case. Since peri-implant inflammations show apparent parallels to inflammations around teeth, peri-implant therapy according to the CIST protocol referred rather strictly to periodontitis treatment.

In the meantime, we have learned a lot: Though some principles of peri-implant treatment might have remained unchanged, the special anatomy of the implant-bone interface on one side and the titanium surface itself on the other hand require specific therapeutic measures.

TERAPIJA PERI-IMPLANTITISA - ŠTO SE PROMIJENILO U 20 GODINA?

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U posljednjih 40 godina terapija implantatima postala je vrlo uspješan i popularan modalitet zamjene zuba koji nedostaju.

Unatoč izvrsnim stopama preživljavanja zubnih implantata, klinička ispitivanja od početka su kontinuirano otkrivala jednu te istu glavnu biološku komplikaciju: peri-implantitis. Pogodeni implantati morali su se klasificirati kao neuspjesi koji će se konačno izgubiti, nanoseći i ogromna oštećenja susjednoj koštanoj strukturi.

Budući da je problem bio nov, a sheme liječenja nedostatne, postojala je velika neizvjesnost u tome kako prevladati peri-implantitise.

Zatim su, prije više od dvadeset godina, Lang i Mombelli razvili protokol „kumulativne interceptivne potporne terapije“ (CIST) kao vrlo jednostavan alat za izbjegavanje i liječenje peri-implantitisa. Pri tome se predlažu određeni koraci liječenja ovisno o kliničkim parametrima pojedinog slučaja. Budući da peri-implantitis pokazuje prividne paralele s upalom oko zuba, terapija peri-implantitisa prema CIST protokolu odnosila se strogo na parodontitis.

U međuvremenu smo naučili mnogo toga: iako su neki principi liječenja peri-implantitisa možda ostali nepromijenjeni, posebna anatomija sučelja kosti-implantata s jedne strane i same površine titana zahtijevaju određene terapijske mjere.

MINIMAL INVASIVE AESTHETIC CORRECTIONS OF PERIODONTALLY TREATED FRONT TEETH

Prof.dr.sc. Olga Polydorou

Medical Center, University of Freiburg

Periodontally damaged teeth are not uncommon nowadays. Almost 50% of the population suffers from a form of periodontitis. Successful periodontal treatment can lead to a change in the appearance of the front teeth at any age of the patients. Patients with peri-

MINIMALNO INVAZIVNE ESTETSKJE KOREKCIJE PARODONTOLOŠKI LIJEČENIH PREDNJIH ZUBA

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Parodontološko kompromitirani zubi danas nisu rijetkost. Gotovo 50% stanovništva pati od jednog od oblika parodontitisa. Uspješno parodontološko liječenje može dovesti do promjene izgleda prednjih zuba u bilo kojoj dobi bolesnika. Pacijenti s parodontitisom

odontally treated teeth often suffer because of the existence of gaps, tooth migration, extrusion of the affected teeth and/or incorrect loading of the involved teeth.

An additional point nowadays is the importance of the aesthetics of the smile in a person's self-confidence. Composite materials offer a very good solution for fulfilling patients' wishes with regard to the desired aesthetics of the front teeth. Nowadays, gaps in the anterior region or the reshaping of teeth can be successfully treated with minimally invasive therapy and modern composite materials.

In the present lecture, the restorative possibilities for the reconstruction of periodontally treated teeth in the anterior region will be described. The methods that can be used for aesthetic reconstruction of the front teeth, by using minimally invasive therapy in a short treatment time, will be presented, by analyzing and discussing the possible restorative treatment for different patients' cases.

POST-ENDODONTIC DIRECT ADHESIVE RESTORATIONS

PD Dr. med. dent. Tobias Tauböck

Clinic of Conservative and Preventive Dentistry, University of Zurich

The restoration of endodontically treated teeth represents a major restorative challenge in contemporary dentistry. Traditional reconstructive concepts for root-filled teeth are mainly based on highly invasive post-and-core treatments and full-crown coverage. Improvements in adhesive techniques and fiber-reinforced composites have opened new paths toward more conservative direct post-endodontic restorations.

The lecture addresses the specific requirements of post-endodontic restorations, and presents innovative minimally invasive therapy concepts for re-stabilizing root-filled teeth with fiber-reinforced adhesive restorations.

Oral presentations

EMBRYOTOXICITY OF DENTAL RESTORATIVE MATERIALS

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Introduction: Final adjustment and polishing or removal of dental fillings produce particles of restorative materials of various sizes that can reach the wastewater. The purpose of this study is to investigate the effect of particles of restorative materials and their degradation products on the environment and non-target organisms using *Danio rerio* zebrafish embryos.

Materials and methods: The study included dental amalgam (Amalcap plus, Ivoclar Vivadent), commercial composite (Tetric EvoCeram, Ivoclar Vivadent; A2) and laboratory composite (BisGMA / TEGDMA, 70wt% filler). After polymerization of the composite materials (Bluephase G2, Ivoclar Vivadent; 1200mW / cm², 10s), or hardening of the amalgam (1h), micrometer particles were made and suspended in artificial water at various dilutions. Samples were continuously shaken during 48-h and 7-days incubation, followed by determination of embryotoxicity using *Danio rerio* embryos. Within 96 h of embryonic development on tested samples, lethal and sublethal (developmental abnormalities, cardiotoxicity, melanogenesis, etc.) endpoints were monitored.

Results: All tested samples revealed high embryotoxicity. The commercial composite showed the lowest toxicity (1.5g of the composite caused 90% mortality, while in the other tested materials the same effect was observed already during the 250mg test). The laboratory composite showed higher toxicity in comparison to the commercial one, but its toxicity was reduced after 7 days of incubation compared to 48-h. Unlike the composite, the amalgam showed increased toxicity after 7 days of incubation (100%) versus 48-h (60%). High mortality on amalgam was present at all tested dilutions (0.25-4g).

Conclusion: The highest percentage of composite-induced embryotoxicity was observed after 48 h of material incubation, while the highest percentage of amalgam-induced mortality was recorded after 7-days of material incubation. The obtained results emphasize the importance of such research and contribute to the establishment of biomarkers at different levels of biological organization in order to determine their safety for environment and non-target organisms.

ALGINATE VS. DIGITAL DENTAL IMPRESSION: PRACTITIONER'S AND PATIENT'S PERSPECTIVE

Vuković Kekez I¹, Pačić Karega G¹, Benzon B², Gadža M³, Cigić L⁴, Medvedec Mikić I⁵, Galić I⁶, Nikolov Borić D⁷, Kalibović Govorko D⁸

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često pate zbog postojanja praznina, migracije zuba, istiskivanja zahvaćenih zuba i / ili nepravilnog opterećenja zahvaćenih zuba.

Dodatna točka danas je važnost estetike osmijeha u samopouzdanju osobe. Kompozitni materijali nude vrlo dobro rješenje za ispunjenje želja pacijenata u pogledu željene estetike prednjih zuba. Danas se praznine u prednjem dijelu ili preoblikovanje zuba mogu uspješno liječiti minimalno invazivnom terapijom i modernim kompozitnim materijalima.

U ovom će predavanju biti opisane restorativne mogućnosti za rekonstrukciju parodontološki liječenih zuba u prednjem dijelu. Predstaviti će se metode koje se mogu koristiti za estetsku rekonstrukciju prednjih zuba, primjenom minimalno invazivne terapije u kratkom periodu liječenja, analizom i raspravom o mogućem restorativnom liječenju za različite slučajeve i pacijente.

POST-ENDODONTICKE IZRAVNE ADHEZIJSKE RESTAURACIJE

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Obnova endodontski liječenih zuba predstavlja glavni izazov u suvremenoj restaurativnoj stomatologiji. Tradicionalni rekonstruktivni koncepti endodontski tretiranih zuba uglavnom se temelje na vrlo invazivnim tretmanima uporabe intrakanalnih kolčića i izradi krunica. Pobojšanja adhezijske tehnike i kompozita ojačanih vlaknima otvorili su nove putove ka konzervativnijim izravnim post-endodontskim restauracijama.

Predavanje govori o specifičnim zahtjevima post-endodontske obnove, te predstavlja inovativne koncepte minimalno invazivne terapije za ponovnu stabilizaciju endodontski tretiranih zubi s vlaknima ojačanim adhezivnim restauracijama.

Usmene prezentacije

EMBRIOTOKSIČNOST STOMATOLOŠKIH RESTAURATIVNIH MATERIJALA

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Uvod: U postupcima završne obrade ili uklanjanja stomatoloških ispuna nastaju čestice restaurativnih materijala različitih dimenzija koje dospijevaju u otpadne vode. Svrha ovog istraživanja je istražiti učinak čestica restaurativnih materijala i produkata njihovog raspadanja na okoliš pomoću embrija ribe zebrice *Danio rerio*.

Materijali i metode: U istraživanje su uključeni dentalni amalgam (Amalcap plus, Ivoclar Vivadent), komercijalni kompozit (Tetric EvoCeram, Ivoclar Vivadent; A2) te laboratorijski kompozit (BisGMA/TEGDMA, 70wt% punila). Nakon polimerizacije kompozitnih materijala (Bluephase G2, Ivoclar Vivadent; 1200mW/cm², 10s), odnosno stvrdnjavanja amalgama (1h), napravljene su mikrometarske čestice koje su se suspendirale u umjetnoj vodi u različitim razrjeđenjima. Uzorci su inkubirani na tresilici tijekom 48h ili 7 dana, nakon čega je izveden test embriotoksičnosti na embrijima zebrice *Danio rerio*. Unutar 96h embrionalnog razvoja pratili su se letalni i subletalni (razvojne abnormalnosti, kardiotoksičnost, melanogeneza, itd.) učinci testiranih uzoraka.

Rezultati: Svi testirani uzorci pokazali su visoku razinu embriotoksičnosti. Komercijalni kompozit pokazao je najmanju toksičnost (1,5g kompozita uzrokovalo je 90% mortalitet, dok je kod ostalih testiranih materijala isti učinak zabilježen već prilikom testiranja 250mg). Laboratorijski kompozit bio je toksičniji u odnosu na komercijalni, no njegova toksičnost bila je smanjena nakon 7 dana inkubacije u odnosu na 48-h. Za razliku od kompozita, amalgam je pokazao povećanu toksičnost nakon 7 dana inkubacije (100%) u odnosu na 48-h (60%). Visok mortalitet na amalgamu bio je prisutan kod svih testiranih razrjeđenja (0,25-4g).

Zaključak: Najveći postotak embriotoksičnosti kompozita zabilježen je nakon 48h inkubacije, dok je 7-dnevna inkubacija amalgama uzrokovala porast toksičnosti. Dobiveni rezultati ističu važnost ovakvog tipa istraživanja te čine doprinos uspostavi biomarkera na različitim razinama biološke organizacije koji bi omogućili pravovremeno određivanje ekotoksičnosti stomatoloških restaurativnih materijala.

ALGINATNI VS. DIGITALNI OTISAK: PERSPEKTIVA LIJEČNIKA I PACIJENTA

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Introduction: Dental cast is an indispensable part of a routine diagnostic and therapeutic procedure. Conventional impression materials, e.g. alginate and polyvinyl siloxane are used for capturing intraoral details and subsequent dental casts pouring. Intraoral scanners (IOS) were introduced in dentistry in the early 1980s and became a valid alternative to those impression procedures. IOS is fast, accurate and more pleasant for a patient than conventional impression techniques, making it necessary to introduce that technique in Dental School's curriculum.

Material and methods: Thirty-four dental students performed both techniques on each other and filled two two-part questionnaires (from patient's and practitioner's perspective; before and after impression-taking) to reveal their preferences and expectations from both techniques.

Results: The results showed a statistically significant difference in time needed for digital and conventional impressions, with digital being faster. After the scanning, all participants answered that the digital impression technique would spare more time in their office. The majority of participants thought that digital techniques would completely replace conventional techniques during their lifetime and that attitude hasn't changed afterward.

Conclusion: The results of this study showed participants' inclination towards new impression techniques and the need for their implementation in Dental School's curriculum

PARENTAL ATTITUDE AND EMOTIONAL WELL-BEING MEDIATE ORTHODONTIC TREATMENT DEMAND IN ADOLESCENTS

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Introduction: There is a high interindividual variability of orthodontic treatment demand among adolescents and it is seldom conditioned by the malocclusion severity. The aim was to explore mediating and moderating effects of adolescents' quality of life and parental attitude of their child's orthodontic treatment need on the relationship between malocclusion severity and adolescents' treatment demand.

Materials and methods: Cross-sectional explanatory study was performed on 197 adolescents (55% female) aged 11-14 years, orthodontic patients at the University Dental Clinic in Rijeka and Zagreb. Quality of life was measured using 16-item regression short-form Child Perceptions Questionnaire. Mediation and moderation models were examined by regression analysis.

Results: There is no moderating effect, but mediation has been proven. Parental attitude and impaired emotional well-being diminish the direct linear relationship between malocclusion severity and treatment demand by acting as parallel mediators ($B=0.12-0.33$; $p<0.001$). Oral symptoms, functional limitations and social well-being are not determinants of the treatment request. With the increase in psychological influences of malocclusion and the attitude of parents about the need for treatment, the demand increases.

Conclusion: Parental attitude and emotional well-being shape adolescents' demand for orthodontic treatment. Adolescents who feel ashamed because of their malocclusion and whose parents have a high attitude about the need for treatment will have a greater demand.

VALIDATION OF THE PARENTAL-CAREGIVERS PERCEPTION QUESTIONNAIRE (P-CPQ) IN CROATIA

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Introduction: To perform the Croatian translation and validation of the Parental-Caregivers Perceptions Questionnaire.

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Uvod: Dentalni modeli nezamjenjiv su dio rutinskog dijagnostičkog i terapijskog postupka. Konvencionalni otisni materijali kao što su alginat i polivinilsiloksani koriste se za bilježenje detalja intraoralnih tkiva te potom za izlivanje gipsanih modela. Intraoralni skeneri (IOS) uvedeni su u stomatologiju ranih 1980. i postali alternativa navedenim otisnim postupcima. IOS su brzi, precizni i ugodniji za pacijenta od konvencionalnih otisnih tehnika pa je nužno uvesti ih u kurikulum fakulteta dentalne medicine.

Materijali i metode: Tridesetčetiri studenta dentalne medicine izveli su obje tehnike jedni na drugima i ispunili dva dvodijelna upitnika (iz perspektive liječnika i pacijenta; prije i poslije otiskivanja) da bi saznali njihove preferencije i očekivanja od navedenih otisnih tehnika.

Rezultati: Rezultati su pokazali statistički značajnu razliku u vremenu potrebnom za digitalno i konvencionalno otiskivanje-digitalni je bio brži. Nakon skeniranja svi su ispitanici odgovorili da misle da će im digitalni otisak uštediti više vremena u ordinaciji. Većina ispitanika prije otiskivanja je smatrala da će digitalne tehnike otiskivanja u potpunosti zamijeniti konvencionalne tehnike tijekom njihovog života i taj se stav nije promijenio nakon otiskivanja.

Zaključak: Rezultati ovog istraživanja otkrili su sklonost ispitanika prema novim tehnikama otiskivanja i potrebu za njihovim uvođenjem u kurikulum studija dentalne medicine.

STAV RODITELJA I EMOCIONALNO BLAGOSTANJE POSREĐUJU OBLIKOVANJE ZAHTEJEVA ZA ORTODONTSKIM LIJEČENJEM U ADOLESCENATA

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Uvod: Postoji velika interindividualna varijabilnost zahtjeva za ortodontskim liječenjem među adolescentima i rijetko je uvjetovana stupnjem malokluzije. Cilj je bio istražiti medijacijske i moderacijske učinke kvalitete života adolescenata i stava roditelja o potrebi za ortodontskim liječenjem djeteta na odnos između stupnja malokluzije i zahtjeva za liječenjem adolescenata.

Materijali i metode: Presječno istraživanje provedeno je na 197 adolescenata (55% djevojčice) starosti 11-14 godina, ortodontskih pacijenata na Klinici za dentalnu medicinu u Rijeci i Zagrebu. Kvaliteta života mjerena je regresijskom 16-očestičnom inačicom Upitnika percepcije djece (*Child Perceptions Questionnaire*). Modeli medijacije i moderacije ispitani su regresijskom analizom.

Rezultati: Nema moderacijskog učinka, no dokazan je medijacijski. Stav roditelja te narušeno emocionalno blagostanje smanjuju izravni linearni odnos stupnja malokluzije i zahtjeva za liječenjem djelujući kao paralelni medijatori ($B=0.12-0.33$; $p<0.001$). Oralni simptomi, ograničenja funkcije i društveno blagostanje nisu medijatori zahtjeva. S porastom psiholoških utjecaja malokluzije i stava roditelja o potrebi za liječenjem, raste zahtjev.

Zaključak: Stav roditelja i emocionalno blagostanje oblikuju zahtjev adolescenata za ortodontskim liječenjem. Adolescenti koji osjećaju sram zbog malokluzije te čiji roditelji imaju visoki stav o potrebi za liječenjem imaju veći zahtjev.

VALIDACIJA PARENTAL-CAREGIVERS PERCEPTION QUESTIONNAIRE (P-CPQ) U HRVATSKOJ

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Uvod: Prevesti na hrvatski jezik i validirati Parental-Caregivers Perception Questionnaire (P-CPQ).

Materijal i metode: Učinjen je prijevod unaprijed-unatrag P-CPQ-a. Uzorak je činilo 233 ispitanika (djeca dobi 11-14 godina; 55% ženskog spola) te njihovi roditelji (84% majke) koji su došli na pregled i konzultacije na Kliniku za dentalnu medicinu Kliničkog bol-

Materials and Methods: Forward-backward translation of P-CPQ was made. The study included 233 participants (children aged 11-14 years; 55% female) and their parents (84% mothers) recruited at the Clinic of dental medicine of the Clinical hospital center Rijeka and Zagreb. The Child Perception Questionnaire (CPQ) and P-CPQ were self-administrated. Malocclusion severity was assessed using the Index of Orthodontic Treatment Need Dental Health Component (IOTN DHC). Factor analysis, Pearson correlation and t-test were used in the statistical analysis.

Results: Factor analysis of the P-CPQ indicated mixing of the Emotional Well-being (EW) and Social Well-being (SW) dimensions as well as the Oral Symptoms (OS) and Functional Limitations (FL) dimensions. The two-factor structure is more appropriate than the four-factor structure, explaining 43.3% of variability. EW+SW grouped together account for 25.2% of the variance, while OS+FL 18%. Internal consistency is better for EW+SW (Cronbach $\alpha=0.926$; inter-item correlation $r=0.438$) than for OS+FL ($\alpha=0.833$; $r=0.283$). OS+FL measures mainly alteration of oral health and treatment need ($r=0.341$ and 0.267 ; $p<0.001$) while SW+EW measures mainly well-being and satisfaction with appearance ($r=0.256$ and -0.339 ; $p<0.001$). The correlation between child and parental assessment was statistically significant but weak for both EW+SW and OS+FL ($r=0.482$ and 0.432 ; $p<0.001$). Instrument is able to detect differences between subjects with low and high caries severity and malocclusion severity.

Conclusion: P-CPQ is adequate for use in Croatia, but the two-dimensional structure is better than the original four-dimensional structure.

ničkog centra Rijeka i Zagreb. Ispitanici su samostalno ispunili Child Perception Questionnaire (CPQ) i P-CPQ. Klinički stupanj malokluzije procijenjen je pomoću dentalne komponente Indeksa potrebe za ortodontskom terapijom (IOTN DHC). U statističkoj analizi korištena je faktorska analiza, Pearsonova korelacija i t-test.

Rezultati: Faktorska analiza P-CPQ-a ukazala je na miješanja dimenzija emocionalnog (EW) i socijalnog blagostanja (SW) te oralnih simptoma (OS) i funkcijskih limitacija (FL). Dvofaktorska struktura upitnika je prikladnija od četverofaktorske strukture koja objašnjava 43.3% varijabilnosti. EW i SW grupirane zajedno objašnjavaju 25.2% varijance, a OS i FL 18%. Unutarnja konzistencija je bolja za EW i SW (Cronbach $\alpha=0.926$; međučestična korelacija 0.438) nego za OS i FL (Cronbach $\alpha=0.833$; međučestična korelacija 0.283). OS i FL se primarno odnose na zdravlje i potrebu za terapijom ($r=0.341$ i 0.267 ; $p<0.001$), dok se SW i EW prvenstveno povezuju s blagostanjem i zadovoljstvom izgledom ($r=0.256$ i -0.339 ; $p<0.001$). Korelacija između djetetove i roditeljske procjene je statistički značajna, ali slaba za EW i SW te OS i FL ($r=0.482$ i 0.432 ; $p<0.001$). P-CPQ uspijeva diskriminirati osobe s blažim i težim oblicima karijesa te nižim i višim stupnjem malokluzije.

Zaključak: P/CPQ je prikladan za korištenje u Hrvatskoj, no bolja je dvodimenzionalna nego originalna četverodimenzionalna struktura.

SEM ANALYSIS OF LASER IRRADIATION INFLUENCE ON REINFORCED LITHIUM DISILICATE USING VARIOUS LASER PARAMETERS

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Introduction: Lithium disilicate reinforced with zirconia ceramics offer a high level of accuracy when used in prosthetic dentistry. Their bonding using different resins is highly dependent on micro-mechanical interlocking and adhesive chemical bonding. Investigation of the performances of high strength ceramics when their surface is modified for chemical and mechanical bonding is then required. The aim of this study is to investigate the possibility of using laser for surface treatment of different high strength CAD/CAM ceramics and thus to improve their mechanical and chemical properties.

Materials and methods: A total of 24 reinforced lithium disilicate CAD/CAM ceramic plates (Suprinity, Vita Zahnfabrik, Bad Sackingen, Germany) were prepared. Specimens were then assigned groups including Er:YAG and Nd:YAG laser.

The Laser surface treatment was performed by Er:YAG laser (Fotona, Ljubljana, Slovenia) at 500 mJ, 10 W, medium pulse 100 m/s, 20 Hz, 20 seconds and by Nd:YAG at 80 mJ, 20 Hz, 100 m/s, 20 seconds. Physical modifications of the irradiated ceramic discs were observed by scanning electron microscopy (Tecn, VEGA) and chemically analyzed by Energy-Dispersive Spectroscopy (EDS).

Results: Er:YAG and Nd:YAG laser irradiation produced a modification of the lithium disilicate reinforced with zirconia ceramic surfaces.

The macroscopic observation showed a shinier structure in the groups, while at the SEM observation treated groups showed cracks and fissures.

Conclusion: In the conditions of this study, Er:YAG and Nd:YAG lasers with the parameters used create chemical and physical surface modifications of the ceramics, indicating the possibility of an improvement in adhesion of the tested ceramics.

SEM ANALIZA UTJECAJA DVAJU LASERA I RAZLIČITIH POSTAVKI LASERSKOG ZRAČENJA NA POVRŠINU LITIJ DISILIKATNE STAKLOKERAMIKE OJAČANE CIRKONIJEVIM DIOSIDOM

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Uvod: Litij disilikatna staklokeramika ojačana cirkonijevim diosidom pokazuje izvrsnu preciznost za izradu fiksno-protetskih nadomjestaka u stomatološkoj protetici. Površinska obrada utječe na vezni potencijal CAD/CAM keramičkih materijala mikromehaničkim karakteristikama u kombinaciji s kemijskim potencijalom vezanja zbog čega je potrebno razumjeti i istražiti površinsku strukturu materijala nakon tretiranja pojedinim sredstvima. Cilj ovog istraživanja je ispitati mogućnost korištenja laserskog zračenja kao protokola pripreme površine za cementiranje spomenute keramike uz poboljšanje mehaničko-kemijskih svojstava vezivanja u odnosu na konvencionalne protokole pripreme površine keramike.

Materijali i metode: U ovoj studiji korišteno je 24 uzoraka litijdisilikatne staklokeramike ojačane cirkonijevim diosidom (Suprinity, Vita, Bad Sackingen, Njemačka) podijeljenih u dvije laserirane skupine. Lasersko zračenje provedeno je Er:YAG laserom (Fotona, Ljubljana, Slovenija) slijedećih parametara: 500 mJ, 10 W, medium pulse 100 m/s, 20 Hz, 20 sekundi. Drugi dio laserskog zračenja odnosi se na Nd:YAG laser (Fotona, Ljubljana, Slovenija) s parametrima: 80 mJ, 20 Hz, 100 m/s, 20 sekundi. Nakon tretiranja laserom na površini uzoraka napravljeno je pretraživanje pomoću elektronskog mikroskopa (Tecn, VEGA) s EDS sustavom za kvalitativno-kvantitativnu analizu kemijskih elemenata u uzorku.

Rezultati: Lasersko zračenje rezultira modifikacijom površine litij disilikatne staklokeramike ojačane cirkonijevim diosidom. Makroanalizom uzoraka uočena je sjajna površina dok su kod SEM analize uočene i kod Er:Yag i kod Nd:YAG laseriranih uzoraka pukotine i fisure. **Zaključak:** Unutar ograničenja ovog istraživanja zaključili smo da Er:Yag i Nd:YAG laseri s korištenim parametrima pokazuju kemijsko-fizičku modifikaciju navedene keramike. Laseriranje keramičke površine moglo bi se pokazati kao obećavajući postupak u stomatološkoj protetici u svrhu poboljšanja adhezije i snage svezivanja s cementom.

FLUORIDE RELEASE FROM ACRYLIC RESIN TREATED WITH TWO DIFFERENT FLUORIDE GELS

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Introduction: The purpose of this study was to investigate fluoride charge and release from orthodontic acrylic resins treated with high-concentrated-fluoride gel, containing sodium fluoride and amine-fluoride.

Materials and methods: The materials used in this study were NaF gel (Mirafluor), NaF and AmF gel (Elmex), self-curing orthodontic acrylic resin and deionized water. A total of 18 samples was divided into three groups of six samples each: (A) acrylic resins treated with NaF, (B) acrylic resins treated with NaF and AmF gel and a control group (C) with-

OTPUŠTANJE FLUORA IZ AKRILATA TRETIRANOG S DVA RAZLIČITA FLUORIDNA GELA

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Uvod: Svrha ove studije bila je ispitati primanje i otpuštanje fluorida od ortodontske akrilatne smole tretirane visoko koncentriranim fluoridnim gelom koji sadrži natrijev fluorid i amino-fluorid.

Materijali i metode: Materijali korišteni u ovoj studiji bili su NaF gel (Mirafluor), NaF i AmF gel (Elmex), samostvrdnjujuća ortodontska akrilatna smola i deionizirana voda. Ukupno 18 uzoraka podijeljeno je u tri skupine od po šest uzoraka: (A) akrilatne smole tretirane s NaF, (B) akrilatne smole tretirane s NaF i AmF gelom i kontrolna skupina (C) bez obrade. Napravljeno je po šest ortodontskih akrilatnih pločica za svaku skupinu mi-

out treatment. Six orthodontic acrylic plates for each group were made mixing powder and liquid. Acrylic plates were weighted, treated 30 minutes with fluoride gels and rinsed for 3 minutes under deionized water. After that, acrylic plates were left for 24 hours in 5 mL of deionized water with temperature of 37 °C. Fluoride release was measured using an ion-selective electrode (ORION EA 940) after 24 hours.

Results: Orthodontic acrylic resin treated with NaF released 105,3 mcgF/g. Orthodontic acrylic resin treated with NaF and AmF release 24,6 mcg F/g. The differences between the groups in observed fluoride release statistically significant ($p < 0.05$).

Conclusion: The amount of released fluoride was significantly higher in the samples treated with NaF compared to the samples treated with the combination of NaF and AmF.

HEALTH RESPONSIBILITY, HEALTHY LIFESTYLE AND PSYCHOSOCIAL VALUES OF DENTAL MEDICINE STUDENTS FROM THE SCHOOL OF DENTAL MEDICINE UNIVERSITY OF ZAGREB

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Introduction: The aim of this study was to examine attitudes towards health, healthy lifestyle, and psychosocial aspects of students from the School of Dental Medicine University of Zagreb, and to compare the results between different years of the study, and with similar studies from the literature.

Materials and Methods: The research was conducted using anonymous online Health Promoting Lifestyle Profile (HPLP II) questionnaire in Croatian language, and the results were analyzed using SPSS Statistics software 25.0 version.

Results: From the total number of the participants, 21,2% of them were first year students, 14,9% second year, 15,5% third year, 16,0% fourth year, 16,3% fifth year, and 16,0% sixth year students. Total value of the HPLP II questionnaire was $2,64 \pm 0,34$. Students from higher years achieved higher value on HPLP II questionnaire, while the biggest difference was between second and sixth year students ($2,50 \pm 0,33$ vs. $2,77 \pm 0,32$, $p = 0,001$). Analysis of subscales showed that highest HPLP II value was scored in subscale of interpersonal relationship ($3,30 \pm 0,39$), while lowest one was achieved in subscale health responsibility ($2,17 \pm 0,57$). Statistically significant differences according to the year of the study were in the subscales physical activity ($p = 0,006$), nutrition ($p = 0,002$) and stress management ($p = 0,001$). The highest value of HPLP II questionnaire in all subscales was among sixth year's students, while the lowest value was among students of the second year.

Conclusion: Given results indicate the need for the increased physical activity, awareness about nutrition and help with challenges of student life, particularly those of the lower years of the study.

THE EFFECT OF MUSIC AND VIBROACOUSTIC INTERVENTION ON PATIENT'S ANXIETY LEVELS UNDERGOING DENTAL TREATMENT

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Introduction: Dental anxiety has been found to be a significant problem faced by patients. The aim of this study was to assess the effects of music listening and vibroacoustic stimulation on dental anxiety levels in patients undergoing dental treatment.

Methods: Two hundred thirty one (231) dental patients were selected by Norman-Corah test and allocated in three groups: (1) music group, (2) vibroacoustic group and (3) control group. The music group ($N = 77$) were subjected to music listening and the vibroacoustic group ($N = 77$) to low-frequency sound vibration five minutes before and during dental treatment. The control group ($N = 77$) were not exposed to any intervention than to pleasant approach before and during dental treatment. Dental anxiety levels were assessed before dental treatment by Children's Fear Survey Schedule-Dental Subscale (CFSS-DS), Evaluation of dental care scale, Anxiety Sensitivity Index (ASI), Self-Assessment Manikin image scale (SAM) and after by (CFSS-DS) and (SAM).

Results: In the all three groups of patients, there was a positive change with respect to anxiety and fear level, all of which were statistically significant. The superior effect was observed in vibroacoustic group of patients compared to changes induced in music and in control group.

Conclusion: Both, music intervention and low-frequency sound stimulation, have a positive effect in control of dental anxiety.

ješanjem praška i tekućine. Akrilatne pločice su izvagane, tretirane su 30 minuta fluoridnim gelovima te ispirane 3 minute pod deioniziranom vodom. Nakon toga su akrilatne pločice ostavljene 24 sata u 5 ml deionizirane vode na temperaturi od 37 °C. Nakon 24 sata izmjereno je oslobađanje fluora pomoću ion-selektivne elektrode (ORION EA 940). Rezultati: Ortodontska akrilatna smola tretirana s NaF otpušta 105,3 mcgF / g. Ortodontska akrilatna smola tretirana s NaF i AmF otpušta 24,6 mcg F / g. Razlike između skupina u otpuštanju fluorida statistički su značajne ($p < 0,05$).

Zaključak: Količina otpuštenog fluorida bila je značajno veća u uzorcima tretiranim NaF u usporedbi s uzorcima tretiranim kombinacijom NaF i AmF.

ODNOS PREMA ZDRAVLJU I ZDRAVOM NAČINU ŽIVOTA TE PSIHOSOCIJALNE VRIJEDNOSTI STUDENATA DENTALNE MEDICINE STOMATOLOŠKOG FAKULTETA SVEUČILIŠTA U ZAGREBU

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Uvod: Cilj ovog istraživanja bio je ispitati odnos prema zdravlju, zdravom načinu života i psihosocijalne aspekte studenata Dentalne medicine Stomatološkog fakulteta Sveučilišta u Zagrebu te dobivene rezultate usporediti prema godini studija i s podacima sličnih istraživanja.

Materijali i metode: Istraživanje je provedeno korištenjem anonimnog online Health Promoting Lifestyle Profile (HPLP II) upitnika na hrvatskom jeziku, a rezultati su analizirani u programu SPSS Statistics, verzija 25.0.

Rezultati: Od ukupnog broja sudionika (349), 21,2% bilo je s prve, 14,9% s druge, 15,5% s treće, 16,0% s četvrte, 16,3% s pete i 16,0% sa šeste godine studija. Ukupna vrijednost HPLP II upitnika za sve ispitanike je $2,64 \pm 0,34$. Više godine studija ostvarile su i višu vrijednost HPLP II upitnika, a najveća je razlika između studenata 6. godine ($2,77 \pm 0,32$) i studenata 2. godine ($2,50 \pm 0,33$) ($p = 0,001$). Promatrano po potkategorijama, najviša HPLP II vrijednost ostvarena je u potkategoriji međuljudskih odnosa ($3,30 \pm 0,39$), a najniža u potkategoriji odnosa prema zdravlju ($2,17 \pm 0,57$). Statistički značajne razlike po godini studija vidljive su u potkategorijama tjelesna aktivnost ($p = 0,006$), prehrana ($p = 0,002$) te nošenje sa stresom ($p = 0,001$). U svim potkategorijama najveću su HPLP II vrijednost ostvarili studenti 6. godine, a najmanju studenti 2. godine.

Zaključak: Dobiveni rezultati ukazuju na potrebu povećanja tjelesne aktivnosti, svijesti o zdravoj prehrani i pomoći s izazovima i zahtjevima studentskog života, posebno na nižim godinama studija.

UČINAK GLAZBE I VIBROAKUSTIČNE STIMULACIJE NA RAZINU ANKSIOZNOSTI PACIJENATA KOD DENTALNOG ZAHVATA

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Uvod: Dentalna anksioznost predstavlja značajan problem s kojim se pacijenti suočavaju. Cilj ove studije bio je procijeniti učinke slušanja glazbe i vibroakustične stimulacije na razinu dentalne anksioznosti kod pacijenata koji su podvrgnuti dentalnom zahvatu.

Metode: Dvjesto trideset i jedan (231) pacijent odabran je Norman-Corahovim testom i podijeljeni su u tri skupine: (1) glazbena skupina, (2) vibroakustična skupina i (3) kontrolna skupina. Glazbena skupina ($N = 77$) bila je izložena slušanju glazbe, a vibroakustična skupina ($N = 77$) niskofrekventnim zvučnim vibracijama pet minuta prije i za vrijeme dentalnog zahvata. Kontrolna skupina ($N = 77$) nije bila izložena bilo kakvoj intervenciji nego ugodnom pristupu prije i za vrijeme dentalnog zahvata. Dentalna anksioznost procijenjena su prije dentalnog zahvata pomoću Children's Fear Survey Schedule-Dental Subscale (CFSS-DS), skale vrednovanja dentalnih briga, Anxiety Sensitivity Index (ASI) te Sikovnom skalom samoprocjene (SAM), a nakon (CFSS-DS) i (SAM).

Rezultati: U sve tri skupine ispitanika došlo je do pozitivne promjene s obzirom na razinu anksioznosti i straha, a kod svih skupina su promjene bile statistički značajne. Najveći učinak zabilježen je u vibroakustičnoj skupini ispitanika usporedno sa promjenama u glazbenoj i kontrolnoj skupini.

Zaključak: I glazbena i vibroakustična stimulacije niske frekvencije pozitivno djeluju u kontroli dentalne anksioznosti.

DOES BPC 157 HAVE EFFECT IN COUNTERACTING RADIATION-INDUCED ORAL MUCOSITIS IN RATS? - PILOT STUDY

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Introduction: Radiation-induced oral mucositis (RIOM) is a common side effect and a limiting factor in radiotherapy of head and neck cancer. RIOM has significant clinical and economic consequences and there is still no cytoprotective agent that is effective in its treatment. Stable gastric pentadecapeptide BPC 157 is a cytoprotective agent with potent antiulcer activity, efficient in clinical trials for inflammatory bowel disease and with no toxicity being reported. To counteract RIOM on a rat model we used BPC 157.

Materials and method: Male Albino Wistar rats (200-250 g bw) were randomly assigned. We formed RIOM model as presented before (Acta stomatol Croat. 2019;53(3):280-292.). We irradiated rat's oral cavity with 30 Gy/1h using gynaecological brachytherapy probe (radioisotope Cs-137). Immediately before irradiation, medication (BPC 157 10µg/kg or saline) was given intraperitoneally. The assessment for 10 days included: edema, erythema and ulcerations of the irradiated area (lips, oral mucosa, tongue, oropharynx), paresis of the lips and hair loss from the snout, accordingly scored.

Results: BPC 157 had strong beneficial effect. BPC 157 counteracted edema, erythema and ulcerations of the irradiated area, as well as the paresis of the lips and hair loss from the snout.

Conclusion: Further BPC 157 regimens investigation is still in progress, ie. BPC 157 given continuously in drinking water, from 2 h after irradiation until sacrifice.

BIOCOMPATIBILITY OF FISSURE SEALANTS

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Introduction: The main purpose of this study was to investigate the effects of fissure sealants on buccal cells to assess their biocompatibility.

Materials and methods: This study was conducted on 45 patients (27 girls and 18 boys), 7 to 16 years of age (age mean 12.09 ± 2.20). Buccal swabs (samples) were collected previous to, and also 7, 30 and 90 days after fissure sealant placement. Patients or their parents/legal guardians filled in the questionnaire regarding demographic data (age, gender), dietary habits, health status, medication usage, and recent X-ray exposure.

Results: Statistically significant difference in the number of buccal cells with condensed chromatin between T0 (time before fissure sealant placement) and T4 (90 days after fissure sealant placement) period for Heliaseal F[®] (P = 0.025) was noticed. The other two analyzed materials did not show any significant difference. Factors such as recent X-ray exposure, medication usage, meat, candy, aerated beverages, and tea affect the development of nuclear anomalies such as condensed chromatin, whereas age induces the development of binucleated cells.

Conclusion: Neither of the three tested dental sealants showed a statistically significant rise in the number of nuclear anomalies during a short period. During 90 days period, only Heliaseal F[®] caused a statistically significant increase in the number of cells with condensed chromatin. Although these sealants are already in use, it is of high importance that their biocompatibility is constantly checked, especially *in vivo* clinical studies.

KNOWLEDGE AND EXPERIENCE OF DENTAL TRAUMA: CROSS-SECTIONAL SURVEY AMONG STUDENTS AT THE UNIVERSITY OF SPLIT, CROATIA

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IMA LI BPC 157 UČINKA U SUZBIJANJU RADIOTERAPIJOM INDUCIRANOG ORALNOG MUKOZITISA U ŠTAKORA? PILOT STUDIJA

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Uvod: Oralni mukozitis induciran zračenjem (RIOM) je uobičajena nuspojava i ograničavajući faktor u radioterapiji malignih tumora glave i vrata. RIOM ima ozbiljne kliničke i ekonomske posljedice, a još uvijek nema citoprotektivnog agensa učinkovitog u njegovom liječenju. Stabilni gastrični pentadecapeptid BPC 157 je citoprotektivni agens sa snažnim antiulkusnim djelovanjem, uspješan u kliničkim istraživanjima za liječenje upalne bolesti crijeva, bez zabilježenih nuspojava. Za suzbijanje RIOM-a na štakorskom modelu koristili smo BPC 157. Materijali i metoda: Mužjaci Albino Wistar štakora (tjelesne mase 200-250 g) nasumično su odabrani. Model RIOM-a formirali smo kako je prethodno predstavljeno (Acta stomatol Croat. 2019;53(3):280-292.). Ozračili smo usnu šupljinu štakora s 30 Gy/1h koristeći ginekološku sondu za brahiterapiju (radioizotop Cs-137). Neposredno prije zračenja, štakori su primili terapiju (BPC 157 10µg/kg ili fiziološka otopina) intraperitonealno. Procjena kroz 10 dana je uključivala: edem, eritem i ulceracije ozračenog područja (usne, oralna sluznica, jezik i orofarinks), parezu usne direktno izložene zračenju i gubitak dlake s njuške, koji su na odgovarajući način bodovani. Rezultati: BPC 157 pokazao je snažan blagotvorni učinak. BPC 157 je suzbio edem, eritem i ulceracije ozračenog područja, kao i parezu usne direktno izložene zračenju i gubitak dlake s njuške.

Zaključak: Daljnja istraživanja protokola primjene BPC-a 157 su u tijeku, npr. davanje BPC-a 157 kontinuirano u vodi za piće, od 2 sata nakon zračenja do žrtvovanja.

BIOKOMPATIBILNOST MATERIJALA ZA PEČAČENJE

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Uvod: Glavni cilj ovog istraživanja bio je istražiti biokompatibilnost materijala za pečaćenje, odnosno ispitati njihov utjecaj na stanice bukalne sluznice.

Materijali i metode: U ovom istraživanju sudjelovalo je 45 ispitanika, 27 djevojčica i 18 dječaka; u dobi od 7 do 16 godina (srednja dob 12,09 ± 2,20). Bris bukalne sluznice uzet je neposredno prije postavljanja materijala za pečaćenje te 7, 30 i 90 dana nakon postavljanja pečata. Pacijenti ili njihovi staratelji su ispunili i upitnik vezan za demografske podatke (dob, spol), te podatke o načinu prehrane, zdravstvenom statusu, korištenju lijekova te nedavnoj izloženosti RTG zrakama.

Rezultati: Uočena je statistički značajna razlika u broju stanica s kondenziranim kromatinom za Heliaseal F[®] između vremena prije postavljanja materijala za pečaćenje te 90 dana nakon postavljanja (P = 0,025). Za ostala dva korištena materijala za pečaćenje nije uočena značajna razlika. Izloženost RTG zračenju te konzumacija lijekova, mesa, slatkiša, gaziranih napitaka i čaja utječe značajno na nastanak kondenziranog kromatina, dok spol utječe na nastanak binuklearnih stanica.

Zaključak: Niti jedan ispitivani materijal nije pokazao statistički značajni porast patoloških promjena jezgre tijekom kraćeg vremenskog perioda. Nakon 90 dana, samo je Heliaseal F[®] uzrokovao statistički značajni porast stanica s kondenziranim kromatinom. Iako je riječ o materijalima koji se već koriste u kliničkoj praksi, od velike je važnosti ovakvim *in vivo* kliničkim studijama provjeriti njegovu biokompatibilnost.

ZNANJE I ISKUSTVO O DENTALNIM TRAUMAMA: PRESJEČNA STUDIJA MEĐU STUDENTIMA SVEUČILIŠTA U SPLITU, HRVATSKA

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Introduction: Dental trauma in children is common problem and everyone who works with them should be able to provide proper care at the site of accident. This study evaluated knowledge of dental trauma emergency management among students' who should be capable of managing such injuries in their future professional work.

Material and methods: A cross-sectional online survey was conducted on 679 students from five different studies (152 dental students, 135 medical students, 130 preschool education students, 128 teachers' education students, and 134 physical education students). The obtained data were analysed by the Student t - test or one - way ANOVA, with Tukey's post-hoc test with the level of significance set at $P < 0.05$.

Results: Dental medicine students have shown the best results, compared with medical, physical education, preschool education and teacher's education students (6.75 ± 2.17 vs 4.32 ± 1.67 , 3.69 ± 1.67 , 3.38 ± 1.76 and 3.05 ± 1.55 , respectively; $P \leq 0.001$). As expected, better knowledge was demonstrated by respondent who had been educated on the dental trauma topic (6.78 ± 2.23 vs 3.67 ± 1.65 , $P \leq 0.001$). While, there is no statistically significant difference in knowledge among respondents depending on whether they have had personal experience with dental trauma (4.58 ± 2.17 vs 4.25 ± 2.26 , $P = 0.110$). **Conclusion:** Based on the results of this survey, can be concluded that studied students have limited knowledge regarding dental injuries and their emergency treatment procedures. The obtained data emphasize the importance of additional education of all professions that may be encountered with dental trauma injuries with the aim of improving the outcomes of tooth trauma treatment.

DENTIST'S ATTITUDES IN PROVIDING ORAL HEALTH CARE TO OLDER PEOPLE

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Introduction: This study was aimed at evaluated the attitudes of dentist in providing oral health services to elderly people, their opinion and barriers they experienced in rendering care to them.

Materials and methods: This cross-sectional survey was conducted by online questionnaire among dentist's population (N=463). Respondents were divided depending on whether or not they attended the Geriatric dentistry course during their education, and the difference in their attitudes were observed (15 questions on Likert scale) with the Chi-Squared Test ($P < 0.05$).

Results: Statistically significant difference in the personal and professional data of the respondents was noticed based on their gender ($P \leq 0.001$), age ($P \leq 0.001$), academic degree ($P = 0.004$) and practice setting ($P = 0.014$) depending whether they attended Geriatric dentistry courses.

Conclusion: From the results of this study, it can be concluded that there are some differences in opinion between dentists about providing oral health care to older people. Geriatric dentistry courses in dentist's education should have a significant role in providing knowledge for working with the elderly population. Geriatric dentistry should be included in the undergraduate curricula of dental schools.

CROATIAN PRIMARY AND SECONDARY SCHOOL TEACHERS' KNOWLEDGE AND EXPERIENCE CONCERNING DENTAL TRAUMA AND ITS MANAGEMENT

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Introduction: Dental trauma is one of the important oral health problems in adolescent and childhood period. Children are high-risk group that spends large part of its active day in school. This cross-sectional study has assessed the level of knowledge and experience of Croatian primary and secondary school teachers concerning the management of dental trauma.

Materials and methods: A questioner-based online study has assessed knowledge and ex-

Uvod: Trauma zubi u djece je čest problem i svi koji rade s djecom trebali bi znati pružiti odgovarajuću skrb na mjestu nesreće. Ova studija je imala cilj procijeniti znanje o hitnim postupcima potrebnim prilikom traume zubi kod djece, i to među studentima koji bi se trebali moći nositi s takvim ozljedama u budućem profesionalnom radu.

Materijali i metode: Internetska anketa provedena je na 679 studenata iz pet različitih Studija (152 studenta Dentalne medicine, 135 studenata Medicine, 130 studenata Ranog i predškolskog odgoja, 128 studenata Učiteljskoga te 134 studenata Kineziološkoga fakulteta). Dobiveni podaci analizirani su Student t-testom ili jednosmjernom ANOVA testom, s Tukey-jevim post-hoc testom. Razina statističke značajnosti postavljena je na $P < 0,05$.

Rezultati: Studenti dentalne medicine pokazali su najbolje rezultate u usporedbi sa studentima medicine, kineziologije, ranog i predškolskog odgoja te učiteljskog studija ($6,75 \pm 2,17$ vs $4,32 \pm 1,67$, $3,69 \pm 1,67$, $3,38 \pm 1,76$ i $3,05 \pm 1,55$, slijedom; $P \leq 0,001$). Kao što se i očekivalo, bolje znanje su pokazali ispitanici koji su se prethodno educirali o temi traume zubi ($6,78 \pm 2,23$ vs $3,67 \pm 1,65$; $P \leq 0,001$). Rezultati ukazuju da ne postoji statistički značajna razlika u znanju među ispitanicima ovisno o tome jesu li imali osobnog iskustva s traumom zubi ($4,58 \pm 2,17$ vs $4,25 \pm 2,26$; $P = 0,110$).

Zaključak: Na temelju rezultata ovog istraživanja može se zaključiti da studenti obuhvaćenih studijskih programa imaju ograničeno znanje o ozljedama zubi i postupcima hitnog liječenja. Dobiveni podaci naglašavaju važnost dodatne edukacije svih zanimanja koja se mogu susresti s ozljedama zubi kako bi se poboljšali rezultati liječenja.

STAVOVI DOKTORA DENTALNE MEDICINE O ORALNOM ZDRAVLJU OSOBA STARIJE ŽIVOTNE DOBI

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Uvod: Ovo istraživanje bilo je usmjereno na procjenu stavova doktora dentalne medicine u pružanju oralno zdravstvenih usluga osobama starije životne dobi, njihovo mišljenje i barijere na koje nailaze u liječenju istih.

Materijali i metode: Ovo presječno istraživanje provedeno je putem online upitnika među populacijom doktora dentalne medicine (N=463). Ispitanici su podijeljeni ovisno o tome jesu li ili nisu slušali kolegij Gerontostomatologija tijekom školovanja te se gledala razlika u njihovim stavovima (15 pitanja na Likertovoj skali) Hi-kvadrat testom ($P < 0,05$). **Rezultati:** Uočena je statistički značajna razlika u osobnim i profesionalnim podacima ispitanika za spol ($P \leq 0,001$), dob ($P \leq 0,001$), stručnu spremu ($P = 0,004$) i područje rada ($P = 0,014$), među doktorima dentalne medicine ovisno o tome jesu li slušali kolegij Gerontostomatologije.

Zaključak: Iz rezultata ove studije može se zaključiti kako se stavovi o pružanju oralno zdravstvenih usluga ispitanika doktora dentalne medicine donekle razlikuju. Kolegij Gerontostomatologije na studijima Dentalne medicine trebao bi imati značajnu ulogu u edukaciji budućih doktora dentalne medicine u radu s osobama starije životne dobi. Svaki studij trebao bi težiti implementaciji ovoga kolegija u svoj kurikulum.

ZNANJE I ISKUSTVO PROSVJETNIH DJELATNIKA OSNOVNIH I SREDNJIH ŠKOLA U REPUBLICI HRVATSKOJ O PRUŽANJU PRVE POMOĆI PRILIKOM TRAUMATSKIH OZLJEDA ZUBA

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Uvod: Dentalne traume su jedan od važnih problema oralnoga zdravlja djece i adolescenata. Oni spadaju u rizičnu skupinu koja velik dio aktivnog dana provodi u školskom okruženju. Cilj ove presječne studije bila je procjena znanja i iskustva hrvatskih učitelja i učitelja o zbrinjavanju traumatskih ozljeda zuba.

Materijali i metode: Istraživanjem se temeljilo na anketnom online upitniku kojim se ispitivalo znanje i iskustvo o traumatskim ozljedama zuba među 803 prosvjetna djelatni-

perience with dental injuries among 803 primary and secondary school teachers. The data have been evaluated by the Student-T test or one-way ANOVA, with Tukey's post-hoc. The level of significance was set at $P \leq 0.05$.

Results: Total mean value of teachers knowledge regarding emergency management of dental trauma was 6.59 ± 2.51 (min 0, max 14). There is now significant difference in knowledge among teachers from lower primary, upper primary and secondary education (6.88 ± 2.53 , vs 6.48 ± 2.42 and 6.44 ± 2.58 , respectively; $P = 0.140$). As expected, teachers who had personal experience and witnessed to dental trauma had better knowledge (7.19 ± 2.56 vs 6.39 ± 2.46 , and 7.46 ± 2.12 vs 6.39 ± 2.55 ; $P \leq 0.001$).

Conclusion: The knowledge on emergency management of dental trauma among primary and secondary school teachers in Croatia is insufficient. Since most of teacher expressed willingness for future education regarding this subject, educational campaigns are recommended.

ATTITUDES AND KNOWLEDGE REGARDING ORAL HEALTH AMONG PREGNANT WOMEN

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Introduction: The aim of this study was to evaluate attitudes and knowledge regarding the oral health and infant oral health among pregnant women.

Materials and methods: The questionnaire was anonymous and contained 27 questions about general demographic information, their own experiences about the oral health during pregnancy, the attitudes about the association between the oral health and pregnancy and the infant oral health.

Results: The study involved 325 pregnant women, 18 to 43 years old. They are most informed about the linkage between the oral health and pregnancy from their dentists (53.54%) and least from their general doctors (4%). Multiple regression analyses showed that the final attitude of pregnant women on the association between oral health and pregnancy was statistically significantly dependent on information via television or the Internet ($\beta = 0.536$, $P = 0.008$), and the final attitude on the infant oral health on information from books, magazines and brochures ($\beta = 0.403$, $P = 0.049$). In pregnancy, gingival bleeding was observed by 52.31% of respondents and tooth mobility by 12.31%. The chi-square test found that there was a difference in attitude regarding the age at which they should stop breastfeeding between respondents who had their first pregnancy and those who already had children. Only 9.23% of respondents are aware that breastfeeding can cause tooth decay.

Conclusion: Based on the results of this study, it was concluded that pregnant women in the Republic of Croatia are not sufficiently aware of oral health in pregnancy and infant oral health.

Keywords: oral health care, pregnancy, knowledge

ATTITUDES OF GYNECOLOGISTS ON ORAL HEALTH CARE DURING THE PREGNANCY

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Introduction: The aim of the study was to determine the attitudes and the knowledge of gynecologists in the Republic of Croatia on oral health care during the pregnancy and the association of periodontal disease with the pregnancy outcomes.

Materials and methods: The specialists and residents of gynecology in Republic of Croatia were involved in this cross-sectional study. The survey was conducted by a questionnaire that consisted the questions on general demographic data and issues related to the attitudes of gynecologists to oral health care of pregnant women.

Results: 59.09% of gynecologists showed good knowledge about the association between the oral health and pregnancy. Gynecologists' knowledge of the oral health of pregnant women depends on the level of education and the main source of information.

Conclusion: There are certain misconceptions among the gynecologists about the safety of providing dental treatment during the pregnancy. Additional collaboration between gynecologists and doctors of dental medicine is essential in order for every pregnant woman to receive a satisfactory level of dental care and proper education on the preservation of oral health.

DIGITAL IMAGE CORRELATION ANALYSIS OF MANDIBULAR OVERDENTURE RETAINED BY FOUR SHORT MINI DENTAL IMPLANTS

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Introduction: Insertion of short mini dental implants (short MDIs) could be the new treatment modality for cases of extreme mandibular ridge resorption. Aim was to test the

ka osnovnih i srednjih škola (67,4 % osnovna škola i 32,4 % srednja škola). Podaci su obrađeni Student-T testom ili jednosmjernom analizom varijance (ANOVA) s Tukeyevim post-hoc testom. Razina značajnosti je postavljena na $P \leq 0,05$.

Rezultati: Ukupno srednje znanje prosvjetnih djelatnika o hitnim postupcima prilikom zbrinjavanja dentalnih trauma je bilo $6,59 \pm 2,51$ (min 0, max 14). Nema razlike u znanju ispitanika koji educiraju djecu u nižim i višim razredima osnovnih škola te nastavnika u srednjim školama ($6,88 \pm 2,53$, vs $6,48 \pm 2,42$ i $6,44 \pm 2,58$, slijedom; $P = 0,140$). Očekivano, ispitanici koji su imali osobno iskustvo te su svjedočili dentalnoj traumi pokazuju bolju razinu znanja ($7,19 \pm 2,56$ vs $6,39 \pm 2,46$, i $7,46 \pm 2,12$ vs $6,39 \pm 2,55$; $P \leq 0,001$). Zaključak: Razina znanja o traumatskim ozljedama zuba i njihovom upravljanju među prosvjetnim djelatnicima osnovnih i srednjih škola je nedostatna. S obzirom da je većina ispitanika izjavila kako je voljna učiti na ovu temu preporuča se pokrenuti edukacijske kampanje.

STAVOVI I ZNANJE TRUDNICA O ORALNOM ZDRAVLJU

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Uvod: Cilj ovog istraživanja bio je procijeniti stavove i znanje trudnica o oralnom zdravlju u trudnoći i očuvanju oralnog zdravlja djece najranije dobi.

Materijali i metode: Upitnik je bio anonim i sastojao se od 27 pitanja koja su se odnosila na opće demografske podatke, vlastita iskustva o oralnom zdravlju u trudnoći, stavove o povezanosti oralnog zdravlja i trudnoće te očuvanju oralnog zdravlja djece najranije dobi.

Rezultati: U istraživanju je sudjelovalo 325 trudnica, dobi od 18 do 43 godine. Trudnice se o povezanosti oralnog zdravlja i trudnoće najviše informiraju od svog doktora dentalne medicine (53,54 %), a najmanje od liječnika obiteljske medicine (4 %). Višestruka regresijska analiza pokazala je da je konačan stav trudnica o povezanosti oralnog zdravlja i trudnoće statistički značajno ovisan o informiranju putem televizije ili interneta ($\beta = 0,536$, $P = 0,008$), a konačan rezultat stava o oralnom zdravlju djece najranije dobi o informiranju iz knjiga, časopisa i brošura ($\beta = 0,403$, $P = 0,049$). U trudnoći je krvarenje gingive primijetilo 52,31 % ispitanica, a mobilnost zuba njih 12,31 %. Hi-kvadrat testom utvrđeno je da postoji razlika u stavu o dobi u kojoj treba prestati dojiti dijete između ispitanica kojima je prva trudnoća i onih koje već imaju djece. Samo 9,23 % ispitanica svjesno je da dojenje može uzrokovati karijes.

Zaključak: S obzirom na dobivene rezultate istraživanja, zaključeno je da trudnice u Republici Hrvatskoj nisu dovoljno osvijestene o oralnom zdravlju u trudnoći i očuvanju oralnog zdravlja djece najranije dobi.

STAVOVI GINEKOLOGA O ORALNOM ZDRAVLJU TRUDNICA

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Uvod: Cilj ovog istraživanja bio je utvrditi stavove i znanja ginekologa u Republici Hrvatskoj o oralnoj zdravstvenoj zaštiti tijekom trudnoće i povezanosti parodontne bolesti s ishodima trudnoće.

Materijali i metode: U ovu presječenu studiju bili su uključeni specijalisti i specijalizanti ginekologije u Republici Hrvatskoj. Istraživanje je provedeno upitnikom koji se sastojao od općih demografskih podataka te pitanja koja su se odnosila na stavove ginekologa prema oralnoj zdravstvenoj zaštiti trudnica.

Rezultati: 59,09 % ginekologa pokazalo je dobro znanje o povezanosti oralnog zdravlja i trudnoće. Znanje ginekologa o oralnom zdravlju trudnica ovisno je o stupnju edukacije te glavnom izvoru informacija.

Zaključak: Među ginekolozima postoje zablude o sigurnosti pružanja dentalnih tretmana tijekom trudnoće. Potrebna je dodatna suradnja između ginekologa i doktora dentalne medicine kako bi svaka svaka trudnica dobila zadovoljavajuću dentalnu skrb te se pravilno educirala o očuvanju oralnog zdravlja.

UPOTREBA METODE OBJEKTOG RASTERA ZA TESTIRANJE UPOTREBE KRATKIH MINI IMPLANTATA ZA RETENCIJU DONJE POKROVNE PROTEZE

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Uvod: Ugradnja kratkih mini implantata (kratki MDI) mogao bi biti novi način rehabilitacije u situacijama ekstremne resorpcije alveolarnog grebena donje čeljusti. Cilj je bio, uz pomoć metode objektnog rastera (DIC), ispitati ponašanje implantata koji su istovremeno

behavior of dental implants being both, slim and short (short MDIs) for complete overdenture (OD) retention by digital image correlation (DIC).

Materials and methods: Based on CBCT scans of patients with extremely atrophied mandible (interforaminal height < 10 mm), six identical models of an average extremely resorbed mandible were virtually built and 3D printed. In each model, four MDIs (6, 8 or 10 mm long; 2 or 2.5 mm wide) were inserted interforaminally and CoCr reinforced overdentures (OD) were loaded using a testing machine with 150N loads applied on the denture molar region bilaterally, unilaterally and the on anterior region. The precise measurement of von Mises Strain and vertical displacement was conducted using the DIC method. **Results:** Von Mises Strain showed very low values on all models ranging from 0.46 % to 1.23 %, with the highest values observed at the zone of bone-denture contact and at sites closer to the force application. The DIC showed, in all loading stages, identical spreading direction with the maximum strain value within the bone-denture contact line. The same mean value of vertical displacement was measured for all three types of loading, amounting to 0.2 mm on all the models. It followed that the vertical displacement was the result of denture subsidence due to "o-ring" elasticity.

Conclusion: DIC has demonstrated a low level of uniformly distributed strain that allows the use of short MDIs for the retention and stabilization of mandibular OD.

INCIDENCE OF SPORTS-RELATED DENTAL AND TRAUMATIC HEAD INJURIES IN FEMALE AND MALE RUGBY PLAYERS

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Introduction: The aim of this study was to investigate the incidence of sports-related dental injuries and traumatic head injuries, as well as the attitudes about the use of dental mouthguards among female and male rugby players.

Materials and methods: This study was conducted among 75 rugby players, 32 (42.7%) women and 43 (57.3%) men, aged between 16 and 39 years (mean 21 years). All of the included participants were amateur rugby players playing in the First National Croatian league and Regional rugby league. They were administered a questionnaire comprising 29 questions. The first part included questions about age, gender, type of sport and time of playing experience. The second part consisted of questions concerning general and dental trauma and the use of mouthguards. In the third part of the questionnaire, participants answered questions about head injuries.

Results: Male rugby players sustained significantly more dental injuries (18 players, 41.8%) than female rugby players (6 players, 18.7%) ($P=0.035$), with the crown fracture being the most frequent dental injury in both groups. In this study 57 (67%) participants were using a mouthguard, 24 (75%) female and 33 (77%) male rugby players. There were 45 (60%) players who sustained head injury while playing rugby, female 15 (33.3%) and male 30 (66.7%) ($P=0.002$).

Conclusion: The results of this study showed high incidence of sports-related dental injuries, as well as head injuries, among male and female rugby players. Although most of them used a mouthguard, it is necessary to rise the awareness about dental injuries prevention.

ASSESSMENT OF DIFFERENCES IN COGNITIVE AND PSYCHOMOTOR PERFORMANCE BETWEEN DENTAL AND MEDICAL STUDENTS AT THE UNIVERSITY OF SPLIT SCHOOL OF MEDICINE

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Introduction: The aim of this study was to compare cognitive and psychomotor skills between dental and medical students at the University of Split School of Medicine.

Materials and methods: The study was conducted among students of dental medicine and medicine at the University of Split School of Medicine, during their second (T1) and sixth (T2) year of education. There were 39 medical students and 40 dental students participating in the study. Subjects completed three Complex Reactionmeter Drenovac (CRD) series tests: CRD 311 test (light signal position discrimination test), CRD 411 test (operational thinking test) and CRD 11 test (convergent thinking test). The results obtained were analyzed using three parameters: total test solving time (UKT), minimum single task solving time (MinT) and number of test errors (BrPog).

Results: Out of 79 students participating in this study, there were 21 (26.6%) men and

no uski i kratki (kratki MDI) za retenciju donje pokrovne proteze (PP).

Materijali i metode: Na temelju CBCT snimki pacijenata s izrazitom resorpcijom donjeg alveolarnog grebena (intraforaminalna visina <10 mm) napravljeno je šest identičnih modela prosječne izuzetno resorbirane mandibule pomoću tehnologije 3D printa. U svaki model su ugrađena četiri MDI-ja intraforaminalno (duljine 6, 8 ili 10 mm; širine 2 ili 2,5 mm) te izrađene PP ojačane metalom. Modeli su opterećivani pomoću statičke kidalce silom od 150 N obostrano u području molara, jednostrano u području molara i u anteriornom području. Precizno mjerenje von Misesova Straina i vertikalnog pomaka provedeno je pomoću DIC metode.

Rezultati: Von Mises Strain pokazao je vrlo niske vrijednosti na svim modelima u rasponu od 0,46% do 1,23%, s najvišim vrijednostima u zoni kontakta proteza-kost i na mjestima bližim primjeni sile. DIC metoda je u svim fazama mjerenja pokazala identičan smjer širenja s maksimalnom vrijednošću naprezanja unutar zone kontakta proteza-kost. Za sve tri vrste opterećenja izmjerena je ista srednja vrijednost vertikalnog pomaka koja je iznosila 0,2 mm na svim modelima. Dokazano je da je vertikalni pomak posljedica slijeganja proteze zbog elastičnosti gumenog prstena unutar retencijske matrice.

Zaključak: DIC metodom dokazala je nisku razinu jednoliko rasprostranih naprezanja koja omogućuju upotrebu kratkih MDI za retenciju i stabilizaciju mandibularne PP.

UČESTALOST SPORTSKIH DENTALNIH OZLJEDA I TRAUMATSKIH OZLJEDA GLAVE U IGRAČICA I IGRAČA RAGBIJA

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Uvod: Cilj ovog istraživanja bio je procijeniti učestalost sportskih dentalnih ozljeda i traumatskih ozljeda glave u igračica i igrača ragbija, kao i njihove stavove o korištenju sportskih dentalnih štitičnika.

Materijali i metode: U istraživanju je sudjelovalo 75 igrača, 32 (42,7%) žene i 43 (57,3%) muškarca, dobi od 16 do 39 godina (prosječno 21 godina). Svi ispitanici bili su amaterski ragbi igrači koji su igrali u prvoj nacionalnoj Hrvatskoj ragbi ligi i Regionalnoj ragbi ligi. Podatci su prikupljeni putem upitnika koji se sastojao od 29 pitanja. Prvi dio uključivao je pitanja o dobi, spolu, vrsti sporta i vremenu igranja. Drugi dio sastojao se od pitanja koja su se odnosila na opću i dentalnu traumu te uporabu dentalnih štitičnika za zube. U trećem dijelu upitnika sudionici su odgovorili na pitanja o ozljedama glave.

Rezultati: Igrači ragbija imali su značajno više dentalnih ozljeda (18 igrača, 41,8%) od igračica (6 igračica 18,7%) ($P=0,035$), a najučestalija dentalna ozljeda bila je fraktura krunice zuba u obje skupine ispitanika. Od ukupnog broja ispitanika, njih 57 (67%) koristilo je dentalni štitičnik, od čega 24 igračice (75%) i 33 igrača (77%). U ovom istraživanju od ukupnog broja ispitanika njih 45 (60%) je imalo ozljedu glave tijekom igranja ragbija, od čega je bilo 30 (66,7%) igrača i 15 (33,3%) igračica ($P=0,002$).

Zaključak: Rezultati ove studije pokazali su visoku učestalost sportskih dentalnih ozljeda te ozljeda glave među igračima i igračicama ragbija. Iako je većina njih koristila dentalne štitičnike, potrebno je podići svijest o mogućnostima prevencije dentalnih ozljeda.

USPOREDBA KOGNITIVNIH I PSIOMOTORIČKIH SPOSOBNOSTI IZMEĐU STUDENATA DENTALNE MEDICINE I MEDICINE MEDICINSKOG FAKULTETA SVEUČILIŠTA U SPLITU

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Uvod: Cilj ovog istraživanja bio je usporediti kognitivne i psihomotoričke sposobnosti između studenata dentalne medicine i medicine Medicinskog fakulteta Sveučilišta u Splitu. **Materijali i metode:** Istraživanje je provedeno među studentima dentalne medicine i medicine Medicinskog fakulteta Sveučilišta u Splitu tijekom druge (T1) i šeste (T2) godine studija. Ukupno je sudjelovalo 39 studenata medicine i 40 studenata dentalne medicine. Ispitanici su rješavali tri testa na kompleksnom reakciometru Drenovac (CRD): test CRD 311 (test diskriminacije položaja svjetlosnog signala), test CRD 411 (test operativnog mišljenja) i test CRD 11 (test konvergentnog mišljenja). Dobiveni rezultati analizirani su pomoću tri parametara: ukupno vrijeme rješavanja testa (UKT), najkraće vrijeme rješavanja jednog zadatka (MinT) te broj pogrešaka na testu (BrPog).

Rezultati: Od ukupno 79 studenata koji su sudjelovali u istraživanju bilo je 21 (26,6%)

58 (73.4%) women, aged from 23 to 26 years. The change between T1 and T2 in MinT on CRD 311 test in dental students was 0.04 ± 0.03 s, while in medical students it was 0.01 ± 0.0 s ($P=0.037$). Also, dental students had greater change in UKT compared to medical students (1.6 ± 0.34 s vs. 0.82 ± 0.18 s, $P=0.005$). Dental students also achieved greater change in UKT on CRD 411 test compared to medical students (5.03 ± 1.88 s vs. 1.6 ± 2.37 s, $P=0.016$).

Conclusion: Based on the results of this study, it was concluded that dental students showed better improvement in cognitive and psychomotor skills compared to medical students assessed with CRD series tests.

YOUNG ATHLETES' ATTITUDES AND SATISFACTION WITH CUSTOM-MADE MOUTHGUARDS

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Introduction: The aim of this study was to evaluate water polo and rugby players' attitudes about custom-made mouthguards (MG), as well as their satisfaction with it.

Materials and methods: There were 16 water polo and 14 rugby players, aged 14 years (13-15 years), participating in this study. Each athlete was provided with a MG and filled out a questionnaire evaluating their knowledge and attitudes about mouthguards. Athletes' satisfaction with a MG was assessed using the Visual Analog Scale (VAS) in six categories – breathing, communication, oral dryness, thirst, stability and satisfaction, prior to the beginning of a MG use, as well as after three months.

Results: Rugby players were more frequently advised to use MGs (85.7% rugby players vs. 43.8% water polo players, $P=0.026$). Prior to participation in this study there were 11 (78.6%) rugby players and none of the water polo players using a MG. After three months, 14 (100%) rugby players and 12 (75%) water polo players were using a MG. There were significant improvements in subjective assessment of MG's impact on breathing (water polo: 68.4 ± 12.7 to 78.9 ± 16.2 , $P=0.007$; rugby 55.4 ± 22.9 to 84.1 ± 16.3 , $P<0.001$) and communication (water polo: 57.6 ± 21.2 to 74.2 ± 21.3 , $P=0.004$; rugby: 35.6 ± 18.4 to 67.4 ± 24.2 , $P<0.001$) after three months, while satisfaction improved only in rugby players (49.6 ± 21.9 to 88.6 ± 13.9 , $P<0.001$).

Conclusion: The results of this study showed that rugby players used a MG more often than water polo players although subjective assessment of satisfaction with a MG was high in both groups of athletes.

muškarac i 58 (73.4%) žena, u dobi od 23 do 26 godina. Promjena između T1 i T2 u MinT na testu CRD 311 u studenata dentalne medicine bila je $0,04 \pm 0,03$ s, dok je u studenata medicine iznosila $0,01 \pm 0,0$ s ($P=0,037$). Također, studenti dentalne medicine imali su veću promjenu UKT u odnosu na studente medicine ($1,6 \pm 0,34$ s vs. $0,82 \pm 0,18$ s, $P=0,005$). Na testu CRD 411 studenti dentalne medicine također su postigli veću promjenu u UKT u odnosu na studente medicine ($5,03 \pm 1,88$ s vs. $1,6 \pm 2,37$ s, $P=0,016$). Zaključak: Rezultati ovog istraživanja pokazali su da su studenti dentalne medicine tijekom svog studiranja više napredovali u kognitivnim i psihomotoričkim sposobnostima mjerenim CRD serijom testova u odnosu na studente medicine.

STAVOVI I ZADOVOLJSTVO MLADIH SPORTAŠA INDIVIDUALNIM DENTALNIM ŠTITNICIMA

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Uvod: Cilj ovog istraživanja bio je procijeniti stavove vaterpolista i ragbijaša o sportskim dentalnim štitnicima te njihovo zadovoljstvo takvim štitnicima.

Materijali i metode: U ovom istraživanju sudjelovalo je 16 vaterpolista i 14 ragbijaša, dobi 14 godina (13-15 godina). Svakom ispitaniku napravljen je individualni dentalni štitnik te su svi ispunili upitnik o poznavanju dentalnih štitnika. Vizualno-analogni ljestvica (VAS) korištena je za subjektivnu procjenu zadovoljstva dentalnim štitnikom u šest kategorija – disanje, govor, suhoća usta, žeđ, stabilnost i zadovoljstvo, na početku istraživanja i nakon tri mjeseca.

Rezultati: Ragbijašima je značajno češće bilo preporučeno korištenje dentalnih štitnika za prevenciju dentalnih ozljeda tijekom bavljenja sportom (85,7% ragbijaša vs. 43,8% vaterpolista, $P=0,026$). Prije uključivanja u istraživanje dentalni štitnik koristilo je 11 (78,6%) ragbijaša i niti jedan vaterpolist. Tri mjeseca nakon početka istraživanja 14 ragbijaša (100%) i 12 (75%) vaterpolista koristili su izrađene dentalne štitnike. Nakon tri mjeseca korištenja dentalnog štitnika pokazano je statistički značajno poboljšanje s obzirom na početak istraživanja u dvije kategorije – disanje (vaterpolo: $68,4 \pm 12,7$ do $78,9 \pm 16,2$, $P=0,007$; ragbi: $55,4 \pm 22,9$ do $84,1 \pm 16,3$, $P<0,001$) i govor (vaterpolo: $57,6 \pm 21,2$ do $74,2 \pm 21,3$, $P=0,004$; ragbi: $35,6 \pm 18,4$ do $67,4 \pm 24,2$, $P<0,001$), dok se zadovoljstvo značajno popravilo samo u ragbijaša ($49,6 \pm 21,9$ do $88,6 \pm 13,9$, $P<0,001$).

Zaključak: Rezultati ovog istraživanja pokazali su da ragbijaši češće koriste dentalne štitnike u odnosu na vaterpoliste iako je subjektivno procijenjeno zadovoljstvo dentalnim štitnicima bilo visoko u obje skupine sportaša.

SEVERITY OF HYPODONTIA - EFFECTS ON CRANIOFACIAL MORPHOLOGY

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Introduction: Hypodontia is the congenital absence of one or more teeth and is the most common developmental anomaly of human dentition. The aim of this study was to evaluate the effects of severity of hypodontia on craniofacial morphology.

Materials and methods: The sample was gained from the patients' database of the Department of Orthodontics, Dental Clinic, Clinical Hospital Center Zagreb. It consisted of 194 subjects (75 males and 119 females), diagnosed with permanent dentition tooth agenesis. Based on the severity of hypodontia sample was divided into mild (1-2 missing teeth), moderate (3-5 missing teeth) and severe groups (6 or more missing teeth). Thirty-three angular and linear parameters were performed on lateral cephalograms.

Results: Decrease of SNA angle values (tendency towards maxillary retrognathism), decrease of anterior lower facial height, increase of posterior cranial base length, decrease of cranial base flexion angle, shorter length of mandible body and ramus, decrease of mandibular angle, a greater Jarabak ratio (greater tendency towards horizontal growth pattern), retrusion of the incisors, decrease of interincisal angle, retrusion of the lips, a sharper mentolabial and nasolabial angles and a more concave soft tissue profile were observed to be proportional to the severity of hypodontia.

Conclusion: Due to a number of missing teeth, subjects with permanent dentition hypodontia were observed to have different craniofacial morphology in the lower third of the face. Skeletal and dental relationships have a key role in creating of a treatment plan, so the results of this study could be very useful during clinical work.

OPSEŽNOST HIPODONTIJE - UTJECAJ NA KRANIOFACIJALNA OBLIJEŽJA

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Uvod: Hipodontija je kongenitalni nedostatak jednog ili više trajnih zuba te predstavlja jednu od najčešćih razvojnih anomalija u čovjeka. Svrha ovoga istraživanja bila je odrediti utjecaj opsežnosti hipodontije na kraniofacijalna obilježja.

Materijali i metode: Uzorak od 194 ispitanika (75 muškog i 119 ženskog spola), kojima je dijagnosticirana hipodontija trajne dentitije, izdvojen je iz baze podataka pacijenata Zavoda za ortodontiju Klinike za stomatologiju Kliničkoga bolničkog centra Zagreb. Prema opsežnosti hipodontije ispitanici su bili podijeljeni u tri skupine: blaga (nedostatak 1-2 zuba), umjerena (nedostatak 3-5 zuba) te ozbiljna hipodontija (nedostatak 6 ili više zuba). RTG-kefalometrijska analiza skeletnih i dentalnih odnosa te profila mekih tkiva je učinjena pomoću trideset i tri angularna i linearna parametra na LL-kranioigramima. Rezultati: Kod ispitanika s ozbiljnom hipodontijom, u odnosu na one s blagom i umjerenom, uočene su smanjene vrijednosti SNA kuta (povećana sklonost prema maksimalnom retrognatizmu), smanjena prednja donja visina lica, duža stražnja kranijalna baza, smanjen kut fleksije kranijalne baze, kraći ramus i korpus mandibule, smanjen mandibularni kut, povećan omjer prema Jarabaku (veća tendencija horizontalnom obrascu rasta), povećana retruzija gornjih i donjih inciziva, smanjen interincizalni kut, povećana udaljenost usnica od E linije, oštiri mentolabijalni i nazolabijalni kut te konkavniji mekotiivni profil lica. Zaključak: Pacijenti s hipodontijom trajnih zuba imaju promijenjene karakteristike donje trećine lica, koje ovise o broju zuba koji nedostaju. Bilo koji od dijagnostičkih parametara za određivanje profila lica te skeletnih i dentalnih odnosa ključni su u planiranju terapije te rezultati ovoga istraživanja mogu biti vrlo korisni tijekom kliničkoga rada.

COMBINED ORTHODONTIC-SURGICAL TREATMENT OF SEVERE MANDIBULAR PROGNATHISM: A CASE REPORT

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Introduction: The present study describes a skeletal Class III malocclusion and aims to provide the clinician with rational guidelines for presurgical orthodontic preparation and postsurgical finishing.

Patient and methods: A 17-year old male patient with skeletal class III discrepancy associated with mandibular prognathism and dental compensation, anterior cross bite of -10mm, crowding in both dental arches, missing both upper second premolars and lower left second premolar. Lateral cephalometric analysis confirmed severe class III skeletal discrepancy with significantly mandibular prognathism (SNB= 95.6, ANB= -8.4, WITS=-22.4), mandibular incisors showed compensatory lingual inclination (1-Go-Me= 74.6). **Results:** Treatment plan was based on cephalometric prediction and model surgery. Presurgical orthodontic treatment included decompensation of occlusion, opening space for lower left second premolar, resulting in reverse overjet of -15mm. Accordingly, surgical plan included maxillary advancement of 8 mm using Le Fort I osteotomy and bisagittal split ramus osteotomy with mandibular setback of 10mm to correct skeletal discrepancy and achieve correct overjet and good facial profile. Jaws were repositioned using titanium miniplates and prefabricated occlusal splints. Postsurgical orthodontic treatment was done with vertical elastics. Ten months after surgery, patient started retention phase with Hawley retainers.

Conclusion: Eventhough initial anteroposterior position of maxilla was forward, bimaxillary surgery was performed, due to 18mm of mandibular setback requirement which could cause a relapse, leading to a satisfactory occlusal, functional and aesthetic result. An interdisciplinary treatment involves good diagnosis and intense communication between orthodontist and maxillofacial surgeon, in order to achieve good outcomes in complex orthodontic and surgical cases.

REGENERATIVE ENDODONTIC TREATMENT OF TOOTH WITH NECROTIC PULP AND OPEN APEX BY USING PLATELET-RICH FIBRIN: A CASE REPORT

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Introduction: In the teeth affected by trauma, root development could stop due to the loss of vitality of the root pulp over time and lesions may develop in the periapical region in long-term follow-up. In recent years, regenerative endodontic procedures, which are bio-based treatments that enable the continuation of apical development in such cases, are frequently preferred. The objective of this case report is to present a 12-month follow-up of the regenerative endodontic treatment of maxillary lateral incisor teeth with periapical lesions and immature root development.

Case report: A 28-year-old male patient was referred to the clinic with complaint of pain and swelling. The tooth diagnosed with a necrotic pulp. The patient was informed about alternative treatment methods and it was decided to apply regenerative endodontic treatment procedure with PRF. Following disinfection of the root canal space with double antibiotic paste (1:1: ciprofloxacin, metronidazole), tissue scaffold was created by PRF in the root canal. Biodentine® was used as the sealing material in the pulp chamber and final restoration was done with composite resin.

Results: At the end of the 12-month follow-up period, the resolution of the apical lesion was observed radiographically while complaints of clinical pain and swelling disappeared. However, no apparent thickening of the canal walls or continued root development was observed.

Conclusion: Although it is expected that apical development will continue with the application of regenerative endodontic treatment procedures, it is emphasized that relieving symptoms and bone healing in the periapical region should be the primary goal. Regenerative endodontic treatments do not have a standard in the evaluation of success criteria and should be supported with long-term clinical studies in order to qualify the expected results successfully.

ORTODONTSKO KIRURŠKA TERAPIJA IZRAZITOG MANDIBULARNOG PROGNATIZMA: PRIKAZ SLUČAJA

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Uvod: Prikazati interdisciplinarnu terapiju skeletne malokluzije klase III te dati kliničke smjernice za pretkiruršku i postkiruršku ortodontsku terapiju.

Materijali i metode: Sedamnaestogodišnji pacijent sa skeletnom anomalijom klase III povezanom s mandibularnim prognatizmom i dentalnom kompenziranom okluzijom, obrnutim pregrizom od 10mm, zbijenosti u oba luka, hipodoncijom oba gornja druga premolara te hipodoncijom donjeg lijevog drugog premolara. Analiza lateralnog kefalograma potvrđuje skeletnu klasu III s izrazito teškim mandibularnim prognatizmom (SNB=95.6, ANB= -8.4, WITS=-22.4) te kompenzatornu lingvalnu inklinaciju donjih inciziva (1: Go-Me=74.6). **Rezultati:** Plan terapije temeljio se na predikcijskoj kefalometrijskoj analizi i kirurškim modelima. Pretkirurška ortodontska terapija uključivala je dekompenzaciju okluzije, otvaranje prostora za hipodontni donji lijevi drugi premolar, što je rezultiralo povećanjem pregriza na 15mm. Sukladno tome, kirurški plan terapije uključivao je Le Fort I osteotomiju maksile i anteriorni pomak od 8mm, te bisagitalnu split osteotomiju s pomakom mandibule straga u iznosu od 10mm, kako bi se postigao ispravan pregriz, interkuspidacija te skladan profil. Čeljusti su repozicionirane titanskim pločicama i vijcima i prefabriciranim okluzalnim splintovima. Postkirurška ortodontska terapija sastojala se od konačnog usklađivanja okluzije intermaksilarnim gubicama. Aktivna ortodontska terapija završena je 10 mjeseci nakon kirurškog zahvata i započeta retencijska faza nošenjem Hawley retainera. **Zaključak:** Iako je početno maksila bila u prognatom položaju, interdisciplinarni tim se odlučio za bimaksilarni kirurški zahvat zbog distalnog pomaka mandibule od 18mm koji bi mogao uzrokovati recidiv. Na ovaj način postignuta je optimalna okluzija, funkcija i estetika. Interdisciplinarna terapija uključuje dobru dijagnostiku i intenzivnu komunikaciju između ortodonta i maksilofacijalnog kirurga kako bi se postigli odlični rezultati u kompleksnim ortodontsko-kirurškim slučajevima.

REGENERATIVNO ENDODONTSKO LIJEČENJE ZUBA S NEKROTIČNOM PULPOM I OTVORENIM APEKSOM POMOĆU FIBRINA BOGATOG TROMBOCITIMA: PRIKAZ SLUČAJA

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Uvod: U zubima zahvaćenim traumom razvoj korijena mogao bi prestati zbog gubitka vitalnosti korijenske pulpe s vremenom i stoga trebamo primijeniti dugotrajno praćenje u periapikalnoj regiji. Posljednjih godina često se preferiraju regenerativni endodontski postupci, koji su bio-temeljeni tretmani koji omogućuju nastavak apikalnog razvoja u takvim slučajevima. Cilj ovog prikaza slučaja je predstaviti 12-mjesečno praćenje regenerativnog endodontskog liječenja zuba maksilarnih bočnih sjekutića s periapikalnim lezijama i nezavršenim razvojem korijena.

Prikaz slučaja: U kliniku je upućen 28-godišnji pacijent s pritužbom na bol i oticanje. Zubu je dijagnosticirana nekrotična pulpa. Pacijent je informiran o alternativnim metodama liječenja i odlučeno je primijeniti regenerativni postupak endodontskog liječenja s PRF-om. Nakon dezinfekcije prostora korijenskog kanala dvostrukom antibiotskom pastom (1: 1: ciprofloksacin, metronidazol), PRF u korijenskom kanalu stvorio je skelet tkiva. Biodentine® je korišten kao materijal za brtvljenje u pulpnoj komori, a konačna restauracija napravljena je kompozitnom smolom.

Rezultati: Na kraju razdoblja praćenja od 12 mjeseci, radiolucencija apikalne lezije zabilježena je radiografski, dok su pritužbe na kliničku bol i oticanje nestale. Međutim, nije primijećeno prividno zadebljanje zidova kanala ili daljnji razvoj korijena.

Zaključak: Iako se očekuje da će se apikalni razvoj nastaviti primjenom regenerativnih postupaka endodontskog liječenja, naglašava se da bi ublažavanje simptoma i zacjeljivanje kostiju u periapikalnoj regiji trebao biti glavni cilj. Regenerativni endodontski tretmani nemaju standard u ocjeni kriterija uspjeha i trebalo bi ih podržati dugoročnim kliničkim studijama kako bi se uspješno kvalificirali očekivani rezultati.

POLYMERIZATION OF BULK-FILL COMPOSITE MATERIALS WITH SHORT EXPOSURE TIME OF HIGH LIGHT EMISSION

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Introduction: The composition of contemporary composite materials is changing and polymerization is shifting from classic cross-polymerization to short-chain polymerization, which opens the possibility of shortening the polymerization time with increasing light emission. The purpose of this study was to investigate the efficiency of a new generation LED curing unit with very high radiant emittance in short-time polymerization of contemporary bulk-fill composite materials.

Materials and Methods: Four materials were investigated, three bulk-fills: Filtek One Bulk Fill (3M, St. Paul, USA), Tetric PowerFill (Ivoclar Vivadent, Schaan, Liechtenstein) and Tetric PowerFlow (Ivoclar Vivadent), with Tetric EvoFlow (Ivoclar Vivadent) as a reference. The materials (n=5) were polymerized for 3s with 3050 mW/cm² (Bluephase PowerCure, Ivoclar Vivadent). The degree of conversion (DC) was measured immediately after light curing at the surface and after 24h at surface, 1, 2, 3 and 4mm using a Raman spectrometer (Spectrum GX Perkin-Elmer, Waltham, MA, USA) with laser power 850mW and resolution 4cm⁻¹ with 80 scans/measurement. Mean values were statistically compared using one-way ANOVA with Tukey adjustment for multiple comparisons, at an overall level of significance of 0.05.

Results: All tested materials presented a significant increase in DC at the sample surface after 24h compared to DC immediately after light curing. Flowable materials achieved higher DC than sculptable. 3s curing was sufficient for adequate polymerization of Tetric PowerFlow up to 4mm (surface-70.12±2.98% and 4mm-58.23±5.87% after 24h). Tetric PowerFill at 3mm depth reached 60.80±6.74%, which was statistically similar to surface (66.66±1.21%) after 24h, but dissimilar to 4mm depth after 24h (47.77±5.26%). Filtek One demonstrated the lowest DC values at 4mm depth after 24h (29.96±6.11%). Surprisingly, the reference material Tetric EvoFlow reached very high DC values (surface-87.86±1.21% and 4mm-83.03±2.38% after 24h).

Conclusion: Using a very high light emission for a short-time polymerization of bulk-fill composites is an innovative approach that should be used with caution for materials other than those specifically designed for such use.

EPIDEMIOLOGICAL CHARACTERISTICS OF CARIES IN STUDENTS OF THE SCHOOL OF DENTAL MEDICINE IN ZAGREB

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Introduction: The purpose of the study was to present the prevalence of caries in the students of the School of Dental Medicine in Zagreb by determining the DMF and DMFS index, and to determine whether there is a difference in the prevalence of caries between visual-tactile and radiological diagnosis of caries.

Subjects and Methods: 59 students from the School of Dental Medicine in Zagreb participated in the study; 9 from the fourth and 50 from the fifth year of dental medicine study. Clinical dental examinations were performed on the dental chair using a dental light, a dental mirror, and a probe. Radiological diagnosis of caries was done by analyzing intra-oral bitewing x-ray images of premolars and molars stored in a computer.

Results: The average DMF index value was 5.2 (sd = 3.68) (female respondents 5.28 (sd = 3.68), male respondents 4.5 (sd = 3.78)), and DMFS index 7.06 (sd = 5.43) (female respondents 7.24 (sd = 5.43), male respondents 6.1 (sd = 5.34)). Clinical examination and radiological analysis revealed 210 caries lesions; 182 by radiological analysis only, 15 by radiological analysis and clinical examination, 13 caries lesions were detected only by clinical dental examination.

Conclusion: High DMF and DMFS index indicates the need for education and implementation of preventive procedures from an early age. A large number of caries revealed by radiological analysis supports the lack of clinical examination in the diagnosis of caries.

POLIMERIZACIJA BULK-FILL KOMPOZITNIH MATERIJALA POLIMERIZACIJSKIM SVJETLOM VRLO VISOKE EMISIJE I KRATKOG VREMENA EKSPLOZICIJE

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Uvod: Sastav suvremenih kompozitnih materijala se mijenja i način polimerizacije se odmiče od klasične unakrsne polimerizacije prema kratkolančanoj polimerizaciji, što otvara mogućnost skraćivanja vremena polimerizacije uz povećanje svjetlosne emisije. Svrha ovog istraživanja bila je ispitati učinkovitost nove generacije LED polimerizacijskih uređaja s vrlo visokom emisijom zračenja u kratkotrajnoj polimerizaciji suvremenih bulk-fill kompozitnih materijala.

Materijali i metode: Ispitana su četiri materijala, tri bulk-fill: Filtek One Bulk Fill (3M, St. Paul, SAD), Tetric PowerFill (Ivoclar Vivadent, Schaan, Liechtenstein), Tetric PowerFlow (Ivoclar Vivadent), te Tetric EvoFlow (Ivoclar Vivadent) kao kontrola. Materijali (n = 5) su polimerizirani tijekom 3s s 3050 mW/cm² (Bluephase PowerCure, Ivoclar Vivadent). Stupanj konverzije (SK) izmjeren je odmah na površini nakon osvjetljavanja i na površini, 1, 2, 3 i 4 mm nakon 24 sata pomoću Ramanovog spektrometra (Spectrum GX Perkin-Elmer, Waltham, MA, SAD) sa snagom lasera 850mW i rezolucijom 4cm⁻¹ s 80 skenova/mjerenju. Srednje vrijednosti statistički su uspoređene koristeći jednosmjernu ANOVA s Tukeyjevim prilagodbama za više usporedbi, na ukupnoj razini značajnosti od 0,05.

Rezultati: Svi ispitivani materijali pokazali su značajan porast SK na površini uzorka nakon 24h u odnosu na SK neposredno nakon osvjetljavanja. Tekući materijali postigli su viši SK od kompaktnih. 3s-osvjetljavanje bilo je dovoljno za adekvatnu polimerizaciju Tetric PowerFlow-a do 4mm (površina-70,12±2,98% i 4 mm-58,23±5,87% nakon 24h). Tetric PowerFill na dubini od 3mm dosegao je 60,80±6,74%, što je statistički slično vrijednosti SK na površini (66,66±1,21%) nakon 24h, ali različito od SK na 4mm dubine nakon 24h (47,77 ± 5,26%). Filtek One pokazao je najniže vrijednosti SK na dubini od 4mm nakon 24h (29,96±6,11%). Iznenadujuće, kontrolni materijal Tetric EvoFlow dostigao je vrlo visoke vrijednosti SK (površina-87,86±1,21% i 4mm-83,03±2,38% nakon 24h).

Zaključak: Korištenje vrlo visoke svjetlosne emisije za kratkotrajnu polimerizaciju bulk-fill kompozita je inovativan pristup koji treba rabiti s oprezom za materijale koji nisu specifično namijenjeni za tu svrhu

EPIDEMIOLOŠKA OBLJEŽJA KARIJESA KOD STUDENATA STOMATOLOŠKOG FAKULTETA U ZAGREBU

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Uvod: Svrha rada bila je prikazati prevalenciju karijesa kod studenata Stomatološkog fakulteta u Zagrebu određivanjem KEP i KEPp indeksa, te utvrditi postoji li razlika u nalazu prevalencije karijesa između vizualno-taktilne i radiološke dijagnostike karijesa.

Ispitanici i metode: U istraživanju je sudjelovalo 59 studenata Stomatološkog fakulteta u Zagrebu; 9 sa četvrte i 50 sa pete godine studija dentalne medicine. Klinički pregledi zubi obavljani su na stomatološkom stolu uporabom stomatološkog svjetla, zubnog ogledala i sonde. Radiološka dijagnostika karijesa učinjena je analizom intraoralnih zagriznih rendgenskih slika premolara i molara pohranjenih u računalu.

Rezultati: Prosječna vrijednost KEP indeksa iznosila je 5,2 (s.d.=3,68) (ženski ispitanici 5,28 (s.d.=3,68), muški ispitanici 4,5 (s.d.=3,78)), a KEPp indeksa 7,06 (s.d.=5,43) (ženski ispitanici 7,24 (s.d.=5,43), muški ispitanici 6,1 (s.d.=5,34)). Kliničkim pregledom i radiološkom analizom otkriveno je 210 karijesnih lezija; 182 samo radiološkom analizom, 15 radiološkom analizom i kliničkim pregledom, a 13 karijesnih lezija otkriveno je samo kliničkim pregledom zubi.

Zaključak: Visoki KEP i KEPp indeks upućuju na potrebu edukacije i provođenje preventivnih mjera od najranije životne dobi. Veliki broj karijesa otkrivenih radiološkom analizom govori u prilog nedostatnosti kliničkog pregleda u dijagnostici karijesa.